



## UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

NATIONAL MARINE FISHERIES SERVICE

Northwest Fisheries Science Center

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### MEMORANDUM

Date: January 8, 2007  
From: Interior Columbia Technical Recovery Team  
To: NMFS NW Regional Office, co-managers and other interested parties  
Subject: Scenarios for MPG and ESU viability consistent with TRT viability criteria

#### **Purpose and Scope**

Clearly, the overall goal of recovery planning is to achieve a condition for an ESU where it no longer needs protection under the ESA because it is no longer in danger of extinction or likely to become endangered within the foreseeable future. The ICTRT (2005, 2006) viability criteria recommend that all Major Population Groups (MPGs) in the ESU must be viable before the ESU can be considered at low risk of extinction and a candidate for delisting. Because of the importance of the MPG in determining overall ESU viability, we are providing more focused interpretation and application of ICTRT MPG-level viability criteria. In this memo, we provide, for each MPG in the Interior Columbia recovery domain, a discussion about the combinations of populations that would meet the ICTRT MPG-level recovery criteria if those populations achieved low risk status. We also provide some recommendations and considerations that recovery planners could use to prioritize populations for meeting viability criteria within an MPG. However, in most cases where there are multiple possible combinations of populations that could achieve MPG and ESU viability, we do not provide a single set of populations. Likewise, we did not develop a “least-effort” scenario for achieving MPG viability. While we considered providing such a population set, we concluded there were multiple ways to identify a “least-effort” scenario technically and that scenario would also involve social, economical, and political considerations that are outside of our purview. We do provide some discussion about ways in which populations could be prioritized for recovery efforts.

The “TRT-recommendation” included in this memo for each MPG is a description of populations that, when those populations achieve viable status, would meet the minimum MPG-level viability criteria. The populations included in each recommendation or viable-MPG scenario were selected based on unique characteristics (e.g. run timing, populations size, genetic characteristics), major production areas in the MPG, and spatial distribution of the populations. Importantly, although not all populations in a MPG need to meet TRT viability criteria under most viable-MPG scenarios, it is strongly advisable to attempt to improve the status of more than the minimum number of populations to a low-risk (viable) situation. There are two primary reasons for this:

First, based on current population dynamic theory, the TRT has recommended that all extant populations be maintained with sufficient productivity that the overall MPG productivity does not fall below replacement (i.e. these areas should not serve as significant population sinks). Thus, it would be highly risky to allow the status of any population to degrade. In fact, many populations will need to be improved from their current status to be regarded as “maintained.” As a rule of thumb, the TRT believes that populations that fall within cells adjacent to those that we regard as viable in our risk matrix (Figure 1) can be regarded as “maintained.” We will provide further discussion of this issue in a forthcoming update to our viability document.

Figure 1. Matrix of possible Abundance/Productivity and Spatial structure/Diversity scores for application at the population level. Percentages for abundance and productivity (A/P) scores represent the probability of extinction in a 100-year time period. Cells that contain a “V” are considered viable combinations; “HV” indicates Highly Viable combinations; “M\*” indicates combinations that can be regarded as candidates for “maintained.” The darkest cells represent combinations of A/P and SSD at greatest risk.

		Spatial Structure/Diversity Risk			
		Very Low	Low	Moderate	High
Abundance/ Productivity Risk	Very Low (<1%)	HV	HV	V	M*
	Low (1-5%)	V	V	V	M*
	Moderate (6 – 25%)	M*	M*	M*	
	High (>25%)				

Second, although the possible population sets suggested in this memo would meet TRT recovery criteria for the ESUs, achieving recovery for those populations will likely require attempting recovery in more than just those populations because of the uncertainty of success of recovery efforts. For example, if there is an 80% chance that recovery will be successful in each of a set of three populations identified, there is an overall 51% probability of recovering three populations if recovery efforts are limited to those three populations (McElhany et al. 2003). To have more than a 95% probability of recovering three populations in this case would require attempting recovery of six populations. A low-risk strategy will thus target more populations than the minimum for viability.

### **Prioritizing Populations within Scenarios**

Prioritizing populations is by its nature, a technical and policy exercise. In this memo, we provide descriptions of scenarios that would meet TRT biological viability criteria.

Because these are not, in most cases, a single scenario, we also identified a number of additional factors that could be considered by recovery planners choosing which populations to target in order to meet MPG viability criteria:

- Current status of the population – Recovery planners should consider the current condition of the population with respect to all four VSP parameters. Those that are closest to viability criteria currently may require less effort (but the remaining factors should also be considered.)
- Biological feasibility – This is closely tied to the current status of the population, but includes considerations, for example, of whether particular actions can produce the needed change. It also includes considerations for density-dependence –for example, would the required change be feasible, given current spawner or juvenile capacity?
- Political/social/economic feasibility – Obviously, some recovery actions are constrained by non-biological factors. These may make a population less or more attractive to serve as a low-risk/viable population than it would be by strictly biological criteria.
- Hatchery practices affecting the population – hatchery practices and diversity criteria in some locations may be in conflict. This may affect the choice of populations.
- Monitoring history – Some populations have an extensive history of monitoring data, while others have very little. It may cost less in dollars and effort to determine that a population has met viability criteria with substantial existing monitoring data.
- Presence of multiple species in an area that would benefit by the same actions. Populations may rise in importance when more than one species of concern is in the area, and actions would achieve efficiencies of effort.

### **MPG-level scenarios consistent with TRT criteria for each ESU**

To achieve viable ESUs in the Interior Columbia, the TRT recommends that all extant MPGs meet MPG-level criteria. We, therefore, present combinations of populations within MPGs that would meet viability criteria. For each MPG, we first present the “menu” of populations that would meet our criteria. We then discuss population-specific characteristics or conditions that should be considered when choosing among populations in that menu. Finally, we provide a reduced set of populations that we recommend meet our criteria. We will be providing additional information about the IC-TRT’s recommended approaches to MPGs that include populations that have been extirpated in another memo.

In this document, we identify recommendations and scenarios that are consistent with our criteria.

### *A. Snake River spring/summer chinook salmon ESU*

For the Snake River spring/summer chinook salmon ESU to meet TRT viability criteria, each of the MPGs should meet the scenarios described below:

#### 1. Lower Snake MPG

Component populations:

	Size Category	Life History Type
Tucannon River	Intermediate	Spring
Asotin Creek (functionally extirpated)	Basic	Spring

Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria

Considerations:

- Asotin Creek population is functionally extirpated. Treatment of extirpated populations is discussed more thoroughly in the accompanying memo. However, our general recommendation is that extirpated populations be included in the total number of populations in the ESU (for calculating minimum number of populations in the MPG), but that the initial focus of recovery efforts be put on extant populations, with scoping efforts for re-introductions conducted concurrently.

TRT Recommendation:

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Highly Viable: Tucannon River (receives initial focus)

Re-considered for reintroduction as Asotin Creek  
recovery efforts progress:

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## 2. Grande Ronde/Imnaha MPG

### Component populations:

	Size Category	Life History Type
Wenaha River	Intermediate	Spring
Minam River	Intermediate	Spring
Lostine/Wallowa Rivers	Large	Spring
Lookingglass Creek (functionally extirpated)	Basic	Spring
Catherine Creek	Large	Spring
Upper Grande Ronde	Large	Spring
Imnaha River	Intermediate	Spring/Sum
Big Sheep Creek (functionally extirpated)	Basic	Spring

### Basic application of TRT criteria:

- Four populations must meet viability criteria, one of which must meet high viability criteria
- Population in the Imnaha River has a unique life history strategy; this must meet viability criteria
- Two of the three Large populations must meet viability criteria

### Considerations:

- Lookingglass Creek and Big Sheep Creek populations are functionally extirpated.
- Distributing viable “Large” populations throughout the sub-basin is preferable to having them clumped or contiguous.
- There is the potential for Imnaha to be isolated.
- Wenaha R. is most downstream, providing connectivity with other MPGs.
- Wenaha R. and Minam R. populations are currently the most unaffected by hatchery fish. Hatchery supplementation programs are ongoing in the Imnaha, Wallowa-Lostine, Catherine Creek and Upper Grande Ronde populations.
- Minam R. and Wenaha R. populations have little spatial structure or diversity impairment. They may be candidates for high viability status.

### TRT Recommendation:

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1 Highly Viable and 3 Viable:	Imnaha River Lostine/Wallowa River Catherine Creek OR Upper Grande Ronde R. Wenaha R. OR Minam R.
Maintained:	All remaining extant populations

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### 3. South Fork Salmon MPG

#### Component populations:

	Size Category	Life History Type
Little Salmon River (includes Rapid River)	Intermediate	Spring/Sum
South Fork Salmon River	Large	Summer
Secesh River	Intermediate	Summer
East Fork South Fork Salmon River	Large	Summer

#### Basic application of TRT criteria:

- Two populations minimum must meet viability criteria, one of which must meet high viability criteria.
- Little Salmon River (as the only spring/summer life history).
- One Large population (East Fork South Fork or South Fork) must meet viability criteria.

#### Considerations:

- The Little Salmon's size category is largely driven by small, adjunct tributaries. These adjunct tributaries are also the only places where the spring life history is represented in the population. If this was not the case historically (i.e. if these fish are a result of hatchery production or not representative of the historical condition), the importance of maintaining that life history is somewhat less.
- Little Salmon River population is greatly influenced by Rapid River hatchery production and releases.
- Ongoing supplementation exists in EFSF population (Johnson Creek).

#### TRT Recommendation:

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1 Highly Viable and 1 Viable:	Two populations in the main South Fork basin.
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Maintained:	All remaining extant populations
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#### 4. Middle Fork Salmon MPG

##### Component populations:

	Size Category	Life History Type
Middle Fork Salmon below Indian Creek	Basic	Spring/Sum
Big Creek	Large	Spring/Sum
Camas Creek	Basic	Spring
Loon Creek	Basic	Spring/Sum
Middle Fork Salmon above Indian Creek	Intermediate	Spring
Sulphur Creek	Basic	Spring
Bear Valley/Elk Creek	Intermediate	Spring
Marsh Creek	Basic	Spring
Chamberlain Creek	Intermediate	Spring

##### Basic application of TRT criteria:

- Five populations must meet viability criteria, one of which must meet high viability criteria.
- Big Creek is required by size criteria.
- Two of three Intermediate populations (Middle Fork Salmon above Indian Creek, Chamberlain Creek, or Bear Valley Creek) must meet viability criteria, to meet size criteria.

##### Considerations:

- Chamberlain Creek falls in a significant geographic position – providing connectivity between MPGs.
- Chamberlain Creek has unique, apparently persistent genetic characteristics.
- Marsh Creek is somewhat less isolated, and overall a larger production area than Sulphur Creek.
- Upper Middle Fork mainstem is composed of a number of small tributaries (rather than a core, contiguous spawning area).
- Several populations have potential to achieve Highly Viable status because of high quality habitat.

##### TRT Recommendation:

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1 Highly Viable and 4 Viable: Big Creek  
Chamberlain Creek  
Bear Valley Creek  
Marsh Creek  
Camas OR Loon Creek

Maintained: All remaining extant populations

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## 5. Upper Salmon MPG

### Component populations:

	Size Category	Life History Type
North Fork Salmon River	Basic	Spring
Panther Creek (extirpated)	Intermediate	Spring
Lemhi River	Very Large	Spring
Salmon River mainstem, below Redfish Lake	Very Large	Spring/Sum
Pahsimeroi River	Large	Spring
East Fork Salmon River	Large	Spring/Sum
Yankee Fork	Basic	Spring
Valley Creek	Basic	Spring
Upper Salmon River mainstem, above Redfish Lake	Large	Spring

### Basic application of TRT criteria:

- Five populations must meet viability criteria, one of which must meet high viability criteria
- Pahsimeroi River has the only extant summer life history strategy, and thus must meet viability criteria
- Three Very Large or Large populations (Lemhi R., Pahsimeroi, East Fork Salmon R., Salmon River mainstem, above and below Redfish Lake) must meet viability criteria
- One Intermediate or larger population (Panther Creek is the only Intermediate population) must meet viability criteria.

### Considerations:

- Lemhi historically may have had summer chinook production.
- Panther Creek is extirpated and is the only intermediate population; a large population could be substituted for it.
- Lemhi provides important connectivity to other MPGs, as a large, downstream population.
- Upper Salmon mainstem population is at the geographic “end” of the ESU and MPG.
- Valley Creek had historically larger production than most Basic populations.
- North Fork is the most downstream population. However, fairly few data are available, and substantial anthropogenic effects to population and habitat.
- Yankee Fork is currently occupied by non-native stock.



TRT Recommendation:

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1 Highly Viable and 4 Viable: Lemhi R.  
Pahsimeroi R.  
East Fork Salmon River  
Upper Salmon River  
Valley Creek

Maintained: All remaining extant populations

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*B. Snake River Steelhead DPS*

1. Lower Snake MPG

Component populations:

	Size Category	Life History Type
Tucannon River	Intermediate	A-Run
Asotin Creek	Basic	A-Run

Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria

Considerations: (none)

TRT Recommendation:

1 Highly Viable and 1 Viable:	Tucannon River Asotin Creek
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## 2. Clearwater MPG

Component populations:

	Size Category	Life History Type
Lower Clearwater	Large	A-Run
South Fork Clearwater	Intermediate	B-Run
North Fork Clearwater (extirpated)	Large	
Lolo Creek	Basic	A&B-Run
Selway River	Intermediate	B-Run
Lochsa River	Intermediate	B-Run

Basic application of TRT criteria:

- Three populations must meet viability criteria, one of which must meet high viability criteria.
- Lolo Creek has the only A and B life history, and must meet viability criteria.
- Two Large or Very Large populations (North Fork Clearwater, Lower Clearwater, Lochsa or Selway) must meet viability criteria.
- One additional Intermediate or larger population must meet viability criteria.
- At least one A-run and one B-run population must meet viability criteria.

Considerations:

- TRT criteria for size and life history cannot be met with three populations; four are necessary.
- Lochsa River is more accessible than the Selway River for data collection.
- North Fork population is extirpated.
- A/B life history (as seen in Lolo) may be less important than ensuring that both A-run and B-run fish are present.

TRT Recommendation:

1 Highly Viable and 3 Viable:	Lower Clearwater Lolo Creek
	2 of: Selway River, Lochsa River, SF Clearwater
Maintained:	All remaining extant populations

### 3. Grande Ronde MPG

#### Component populations:

	Size Category	Life History Type
Lower Grande Ronde mainstem	Intermediate	A-Run
Joseph Creek	Basic	A-Run
Wallowa River	Intermediate	A-Run
Upper Grande Ronde mainstem	Large	A-Run

#### Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria.
- Grande Ronde upper mainstem must meet viability criteria, as the only Large population.

#### Considerations:

- The Lower mainstem or Joseph populations would contribute to spatial structure in the lower portion of the MPG.
- Wallowa includes multiple core areas, some unique habitat characteristics (Eagle Caps), but does support a hatchery (with little straying).
- Joseph Creek population is somewhat smaller than the others and has the least hatchery influence.
- Lower Grande Ronde population receives hatchery releases.
- Upper Grande Ronde population currently receives no hatchery releases.
- Joseph Creek may be a candidate for High Viability status.

#### TRT Recommendation:

1 Highly Viable and 1 Viable:	Upper Grande Ronde Joseph Creek OR Lower Grande Ronde
Maintained:	All remaining extant populations

#### 4. Salmon River MPG

Component populations:

	Size Category	Life History Type
Little Salmon and Rapid Rivers	Intermediate	A-Run
South Fork Salmon River	Intermediate	B-Run
Secesh River	Basic	B-Run
Lower Middle Fork Tributaries	Large	B-Run
Upper Middle Fork Salmon River	Large	B-Run
Chamberlain Creek	Basic	A-Run
Panther Creek	Basic	A-Run
North Fork Salmon River	Basic	A-Run
Lemhi River	Intermediate	A-Run
Pahsimeroi River	Intermediate	A-Run
East Fork Salmon River	Intermediate	A-Run
Upper Salmon River	Intermediate	A-Run

Basic application of TRT criteria:

- Six populations must meet viability criteria, one of which must meet high viability criteria
- One of the Large populations (Upper Middle Fork OR Lower Middle Fork Tributaries) must meet viability criteria
- Four additional Intermediate or larger populations must meet viability criteria (all remaining except Secesh and North Fork Salmon River)
- At least one A-run and one B-run must be represented

Considerations:

- South Fork Salmon is the only B-run, intermediate sized population, has no hatchery influence
- Spatial structure should be strongly considered in the choice of populations in this large MPG – those that meet viability criteria should be spread across US, MF and SF and lower Salmon
- A-run populations made up 2/3 of the total populations in this MPG. Where possible, maintaining the distribution of A and B run populations would most closely mirror historical (lower-risk) conditions
- Upper Salmon, EF, Lemhi, Pahsimeroi, Little Salmon/Rapid all have some hatchery influence. This tends to be out of MPG – e.g. Dworshak B, Hells Canyon A.
- Little monitoring on any of these populations except Rapid River
- Secesh, South Fork, Chamberlain and Upper Middle Fork all have no history of hatchery influence, and are relatively natural systems.

TRT Recommendation:

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1 Highly Viable and 5 Viable:	Upper Middle Fork Chamberlain South Fork Salmon
	2 Additional Intermediate or Large populations
	1 Additional population of any size
Maintained:	All remaining extant populations

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5. Imnaha MPG

Component populations:

	Size Category	Life History Type
Imnaha River	Intermediate	A-Run

Basic application of TRT criteria:

- One population must meet viability criteria

TRT Recommendation:

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Highly Viable: Imnaha River

Maintained: N/A

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## 6. Hells Canyon MPG

### Component populations:

	Size Category	Life History Type
Hells Canyon	-	-
Powder River (extirpated)	-	-
Burnt River (extirpated)	-	-
Weiser River (extirpated)	-	-

### Considerations:

- With the possible exception of several small tributaries in Hells Canyon, this MPG is largely extirpated. Fish that are currently occupying those small tributaries may be the only remnants of this MPG . A key research need is to determine whether these are remnants or hatchery strays. If they are remnants, emphasis should be placed on recovering this population. The other extirpated populations are addressed in the accompanying memo.

*C. Snake River fall chinook salmon*

1. Snake River Mainstem MPG

Component populations:

	Size Category	Life History Type
Lower Mainstem	Small <sub>FC</sub>	-
Marsing Reach (extirpated)	Large <sub>FC</sub>	-
Salmon Falls (extirpated)	Large <sub>FC</sub>	-

Basic application of TRT criteria:

- Two populations must meet viability criteria, both of which must meet high viability criteria

Considerations:

- Two upstream populations are extirpated
- The two upstream populations were historically the most productive
- Additional information about the TRT recommended approach to consideration extirpated areas in recovery planning is presented in the accompanying memo. We recognize that there are significant difficulties in re-establishing fall chinook populations above the Hells Canyon complex, and suggest that initial effort be placed on recovery for the extant population, concurrently with scoping efforts for re-introduction. As recovery efforts progress, the risk and feasibility associated with opening this area to fall chinook can be re-assessed.

TRT Recommendation:

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Highly Viable: Lower Mainstem  
Marsing Reach OR Salmon Falls

Re-considered as recovery efforts progress: Marsing Reach or Salmon Falls

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*D. Snake River sockeye salmon*

1. Stanley Lakes Basin

Component populations:

	Size Category	Life History Type
Redfish Lake	-	-
Alturas Lake (extirpated)	-	-
Pettit Lake (extirpated)	-	-
Yellowbelly Lake (extirpated, and of uncertain historical status)	-	-
Stanley Lake (extirpated, and of uncertain historical status)	-	-

Basic application of TRT criteria:

- The IC-TRT required 2/3 of the populations in ESUs with only one MPG to meet viability criteria. This value (2/3) was chosen as a number that was substantially greater than half, with the intent of mitigating for the small number of MPGs with increased numbers of populations. However, there is great uncertainty around the proportion or number of populations that would adequately mitigate risk. With such a small number of populations in this MPG, increasing the number of populations will substantially reduce the risk faced by the ESU. Our next update to our viability criteria will explain the rationale for this recommendation more thoroughly.
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Considerations:

- Four of five populations are entirely extirpated
- Sockeye are currently maintained in a captive broodstock program, and are at extremely high risk
- Additional information about the TRT recommended approach to extirpated areas will be forthcoming.

TRT Recommendation:

2 Highly Viable and 1 Viable:	Redfish Lake Alturas Lake Pettit Lake
Re-considered as recovery efforts progress:	Yellowbelly Lake Stanley Lake

*E. Upper Columbia spring chinook salmon*

1. East Cascades MPG

Component populations:

	Size Category	Life History Type
Wenatchee River	Very Large	Spring
Entiat River	Basic	Spring
Methow River	Very Large	Spring
Okanogan River (extirpated)	Basic (U.S. only)	Spring

Basic application of TRT criteria:

- Three populations must meet viability criteria, two of which must meet high viability criteria

Considerations:

- Okanogan River population is extirpated
- Additional information about the TRT recommended approach to extirpated areas will be forthcoming.
- An additional recommendation to moderate risk for an ESU with only one MPG was to require at least 2 populations to meet highly viable status (<1% extinction risk for abundance and productivity). The lowest risk scenario for the ESU would be for the two very large populations (Wenatchee and Methow) to meet highly viable status. Entiat cannot reach these standards due to its inherent spatial structure and the Okanogan population has been extirpated

TRT Recommendation:

2 Highly Viable and 1 Viable:	Wenatchee River (highly viable) Entiat River Methow River (highly viable)
Re-considered as recovery efforts progress:	Okanogan River

*F. Upper Columbia steelhead*

1. East Cascades MPG

Component populations:

	Size Category	Life History Type
Crab Creek (anadromous component functionally extirpated)	Basic	(Summer A)
Wenatchee River	Intermediate	Summer A
Entiat River	Basic	Summer A
Methow River	Intermediate	Summer A
Okanogan River	Intermediate (Basic for U.S. portion only)	Summer A

Basic application of TRT criteria:

- Three populations must meet viability criteria, two of which must meet high viability criteria
- Two large populations must meet viability criteria

Considerations:

- The anadromous component of Crab Creek was likely historically less robust than those of other populations
- The Okanogan population includes some territory in Canada – for U.S. purposes, this population should meet requirements of a “Basic” population within the U.S., or “intermediate” if status within both countries is considered
- An additional recommendation to moderate risk for an ESU with only one MPG was to require at least 2 populations to meet highly viable status (<1% extinction risk for abundance and productivity). The lowest risk scenario for the ESU would be for the two large populations (Wenatchee and Methow) to meet highly viable status. The Entiat and U.S. Okanogan cannot meet high viability criteria due to their inherent spatial structure, and the anadromous component of Crab Creek has been functionally extirpated.

TRT Recommendation:

2 Highly Viable and 1 Viable:	Wenatchee River Methow River Entiat River Okanogan River
Maintained:	All remaining extant populations
Resident component maintained/reconsidered as recovery efforts progress:	Crab Creek

*Mid-Columbia steelhead*

1. Cascades Eastern Slopes MPG

Component populations:

	Size Category	Life History Type
White Salmon River (functionally extirpated)	Basic	Unknown
Klickitat River	Intermediate	Summer/Winter
Deschutes River Eastside	Intermediate	Summer
Deschutes River Westside	Large	Summer
Crooked River (extirpated)	Very Large	Summer
Fifteenmile Creek	Basic	Winter
Rock Creek	Basic	Summer

Basic application of TRT criteria:

- Four populations must meet viability criteria, one of which must meet high viability criteria
- Fifteenmile Creek is the only winter population, and thus must meet viability criteria
- One Large or Very Large populations must meet viability criteria. Deschutes River Westside is the only extant population meeting that size requirement.
- In addition, two Intermediate populations must meet viability criteria.

Considerations:

- White Salmon is functionally extirpated. It is blocked by a dam three kilometers upstream, and has been the recipient of abundant hatchery releases from the Skamania stock.

TRT Recommendation:

1 Highly Viable and 3 Viable:	Fifteenmile Creek Deschutes River Westside Klickitat River Deschutes River Eastside
Maintained:	Rock Creek

## 2. John Day MPG

### Component populations:

	Size Category	Life History Type
Lower John Day River	Very Large	Summer
South Fork John Day River	Basic	Summer
Middle Fork John Day River	Intermediate	Summer
North Fork John Day River	Large	Summer
Upper John Day River	Intermediate	Summer

### Basic application of TRT criteria:

- Three populations must meet viability criteria, one of which must meet high viability criteria
- Two population in the Large or Very Large size category (Lower John Day and North Fork John Day) must meet viability criteria
- One additional population in the Intermediate (Upper John Day and Middle Fork John Day) category must meet viability criteria

### Considerations:

- Lower John Day River population provides an important spatial structure component, as the most downstream population
- North Fork John Day is strong candidate for High Viability status, as it currently appears to be at low risk.
- South Fork John Day is the smallest of the populations

### TRT Recommendation:

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1 Highly Viable and 2 Viable:	North Fork John Day River Lower John Day River Middle Fork John Day OR Upper John Day
Maintained:	All remaining extant populations

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### 3. Walla Walla-Umatilla MPG

Component populations:

	Size Category	Life History Type
Willow Creek (extirpated)		
Umatilla River	Large	Summer
Walla Walla River	Intermediate	Summer
Touchet River	Intermediate	Summer

Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria
- One Large or Very Large Population (Umatilla River) must meet viability criteria

Considerations:

- Willow Creek population has been extirpated
- Some hatchery influence exists throughout the Walla Walla, Touchet and Umatilla populations.
- Current status suggests that the Walla Walla is closer to meeting viability criteria than the Touchet.

TRT Recommendation:

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1 Highly Viable and 1 Viable:	Umatilla River
	Walla Walla River OR Touchet River
Maintained:	All remaining extant populations

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#### 4. Yakima MPG

Component populations:

	Size Category	Life History Type
Satus Creek	Intermediate	Summer
Toppenish Creek	Basic	Summer
Naches River	Large	Summer
Upper Yakima River	Large	Summer

Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria
- One Large or Very Large (Naches or Upper Yakima) population must meet viability criteria

Considerations:

- Having populations at upper and lower ends of the drainage would contribute to a robust spatial structure for the MPG

TRT Recommendation:

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1 Highly Viable and 1 Viable:	Naches River OR Upper Yakima
	One of the remaining three populations
Maintained:	All remaining extant populations

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